CLAIMS

1. A method for multiplexing communication connections in a telecommunication system based on time division multiple access, comprising the steps of:

- defining a burst structure that consists of symbols and fills a time slot at a radio interface,
- filling the burst structure with symbols, thus composing a transmission burst, and
- transmitting the transmission burst within a time slot;

wherein the step of filling the burst structure with symbols comprises the substeps of:

- taking information symbols of a first kind and filling a first part of the burst therewith,
- taking information symbols of a second kind and filling a second part of the burst therewith and
- taking control symbols and filling certain control parts of the burst therewith.

2. A method according to claim 1, wherein in order to separate different downlink transmissions from a base station to mobile stations it comprises the steps of

- taking information symbols belonging to a first downlink communication connection between said base station and a mobile station and filling a first data field in the burst therewith, and
- taking information symbols belonging to a second downlink communication connection between said base station and a mobile station and filling a second data field in the burst therewith.

3. A method according to claim 2, additionally comprising the steps of:

- taking a first stealing flag control symbol belonging to said first downlink communication connection and filling a first control field in the burst therewith,
- taking a second stealing flag control symbol belonging to said second downlink communication connection and filling a second control field in the burst therewith, and
- taking a common training sequence consisting of known symbols and filling a training sequence field in the burst therewith.

4. A method according to claim 2, additionally comprising the steps of:

- encoding the information symbols belonging to said first downlink communication connection with a first code before filling said first data field in the burst therewith, and
- encoding the information symbols belonging to said second downlink communication connection with a second code, which is different than said first code, before filling said second data field in the burst therewith.

5. A method according to claim 4, additionally comprising the step of parity encoding the information symbols prior to encoding with either said first code or said second code.

6. A method according to claim 1, wherein in order to separate different uplink transmissions from mobile stations to a base station it comprises the steps of:
- taking information symbols belonging to a certain uplink communication connection between a mobile station and said base station and filling a first data field in the burst therewith, and
- taking dummy symbols and filling a second data field in the burst therewith.

7. A method according to claim 6, additionally comprising the steps of:
- taking a first stealing flag control symbol belonging to said uplink communication connection and filling a first control field in the burst therewith,
- taking a dummy stealing flag control symbol and filling a second control field in the burst therewith, and
- taking a training sequence specific to said uplink communication connection and consisting of known symbols, and filling a training sequence field in the burst therewith.

8. A method for separating multiplexed communication connections from each other in a telecommunication system based on time division multiple access, comprising the steps of:
- receiving a signal for the whole duration of a time slot at a radio interface,
- extracting from a first part of a signal received during a time slot a number of information symbols of a first kind,
- extracting from a second part of said signal received during a time slot a number of information symbols of a second kind,
- attempting the decoding of said information symbols of a first kind,
- attempting the decoding of said information symbols of a second kind and

- accepting as received those information symbols the decoding of which proved to be successful.

9. A method according to claim 8, comprising the step of parity checking a sequence of information symbols after attempted decoding, so that those information symbols are accepted as received for which no parity errors were found in the parity checking.

10. A method according to claim 8, wherein the step of extracting a number of information symbols of a first kind comprises the step of taking a first temporally separate part of said signal received during a time slot, and the step of extracting a number of information symbols of a second kind comprises the step of taking a second temporally separate part of said signal received during a time slot, and the method additionally comprises the step of performing joint channel estimation for generating at least two mutually different channel estimates, so that each step of attempted decoding is preceded by the equalization of a part of the received signal by using an individual channel estimate.

11. A method according to claim 10, comprising the step of iteratively refining a channel estimate by feeding back to the joint channel estimation step information from the decoded symbols.

12. A transmitter arrangement for maintaining multiplexed communication connections in a telecommunication system based on time division multiple access, comprising:
- a burst formatter arranged to compose a transmission burst that consists of symbols and fills a time slot at a radio interface,
- means for providing the burst formatter with information symbols of a first kind and information symbols of a second kind;
wherein the burst formatter is arranged to fill a first part of a transmission burst with said information symbols of a first kind, a second part of the transmission burst with said information symbols of a second kind and certain control parts of the transmission burst with control symbols.

13. A transmitter arrangement according to claim 12, wherein said means for providing the burst formatter with information symbols of a first kind comprise a first transmission subchain and said means for providing the burst formatter with information symbols of a second kind comprise a second transmission subchain, so

that said information symbols of a first kind belong to a different communication connection than said information symbols of a second kind.

14. A transmitter arrangement according to claim 12, wherein said means for providing the burst formatter with information symbols of a first kind comprise a transmission subchain and said means for providing the burst formatter with information symbols of a second kind comprise means for instructing the burst formatter to use dummy symbols.

15. A receiver arrangement for maintaining multiplexed communication connections in a telecommunication system based on time division multiple access, comprising:
- a burst decomposer arranged to decompose a transmission burst that consists of symbols and fills a time slot at a radio interface into sequences of information symbols,
- means for separatedly attempting the decoding of different sequences of information symbols extracted from a transmission burst by said burst decomposer, and
- means for accepting as received those information symbols the decoding of which proved to be successful.

16. A receiver arrangement according to claim 15, comprising a decoder and parity checking means for checking the parity of different sequences of information symbols extracted from a transmission burst by said burst decomposer after decoding.

17. A receiver arrangement according to claim 15, comprising:
- means for extracting temporally separate parts from received transmission bursts,
- a joint channel estimator arranged to generate at least two mutually different channel estimates, and
- signal equalizer means for separately equalizing said extracted temporally separate parts of the received signal by using individual channel estimates.

18. A receiver arrangement according to claim 17, comprising means for feeding back to the joint channel estimator information from decoded symbols, so that the joint channel estimator is arranged to perform iterative channel estimation on the basis of the feedback information.